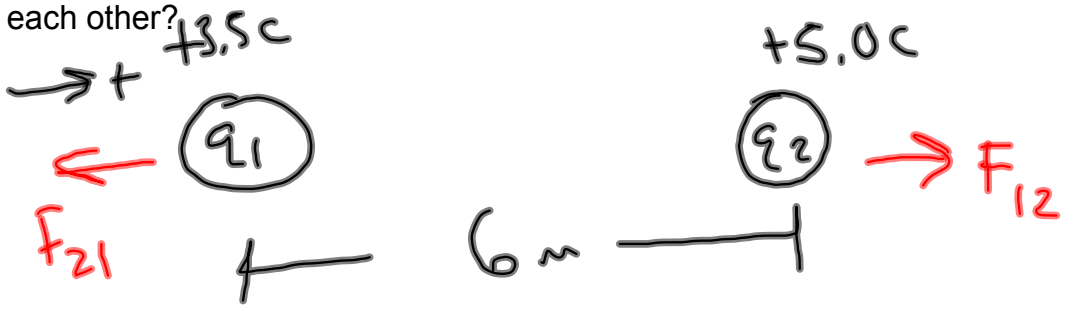
Two charges are stationary in space, and the first has a value of 3.5 C and the second has a value of 5.0 C. If the distance separating them is 6 m, what is the force they exert on each other?

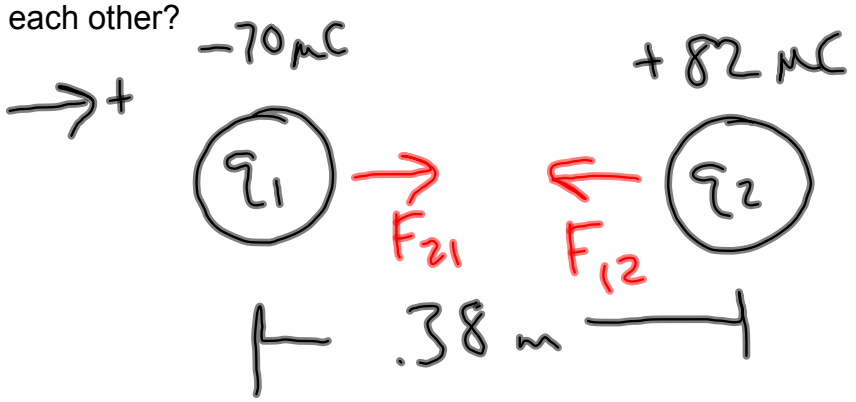


$$F_{12} = \frac{k|q_1||q_2|}{r^2}$$

$$= \frac{(8.99E9\ N\cdot m^2/C^2)(3.5\ C)(5.0C)}{(6\ m)^2}$$

$$= 4.37E9\ N$$

Two charges are stationary in space, and the first has a value of -70 μC and the second has a value of 82 μC. If the distance separating them is 38 cm, what is the force they exert on each other?

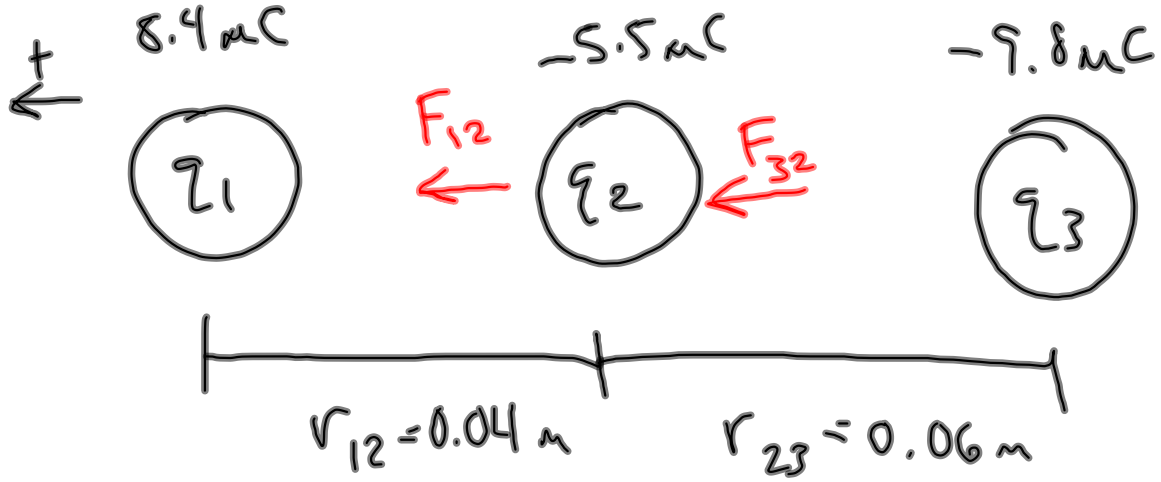


$$F_{21} = \frac{k|q_1||q_2|}{r^2}$$

$$= \frac{(8.99E9\ N\cdot m^2/C^2)(70E-6\ C)(82E-6)}{(.38\ m)^2}$$

$$= 357\ N$$

Three charges are placed on a line. The farthest left charge has a value of 8.4 μC, the middle charge has a value of -5.5 μC, and the farthest right charge has a value of -9.8 μC. The farthest left and middle charges are separated by 4 cm, and the farthest right and middle charges are separated by 6 cm. What is the net force acting on the middle charge?



$$\Sigma \vec{F} = \vec{F}_{12} + \vec{F}_{32}$$

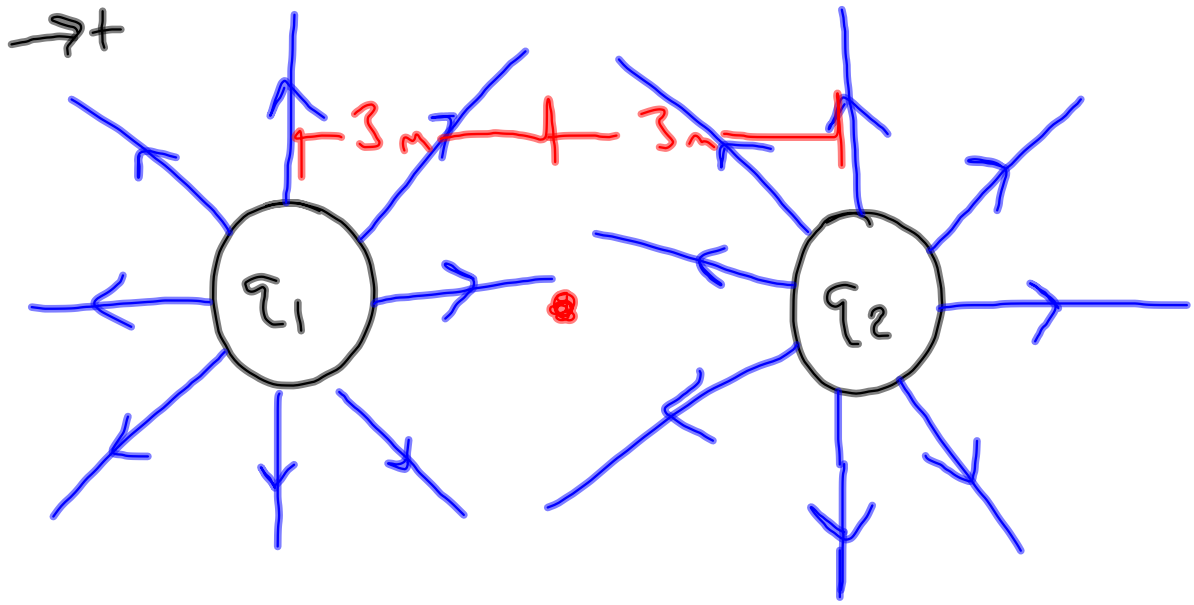
$$= \frac{k|q_1||q_2|}{r_{12}^2} + \frac{k|q_3||q_2|}{r_{23}^2}$$

$$= k|q_2|\left[\frac{|q_1|}{r_{12}^2} + \frac{|q_3|}{r_{23}^2}\right]$$

$$= k(5.5E\text{-}6\,C)\left[\frac{8.4E\text{-}6\,C}{(0.04\,m)^2} + \frac{9.8E\text{-}6\,C}{(0.06\,m)^2}\right]$$

$$= 394\ N$$

Two charges are stationary in space, and the first has a value of 3.5 C and the second has a value of 5.0 C. If the distance separating them is 6 m, what is the electric field that exists at a point halfway between the charges?



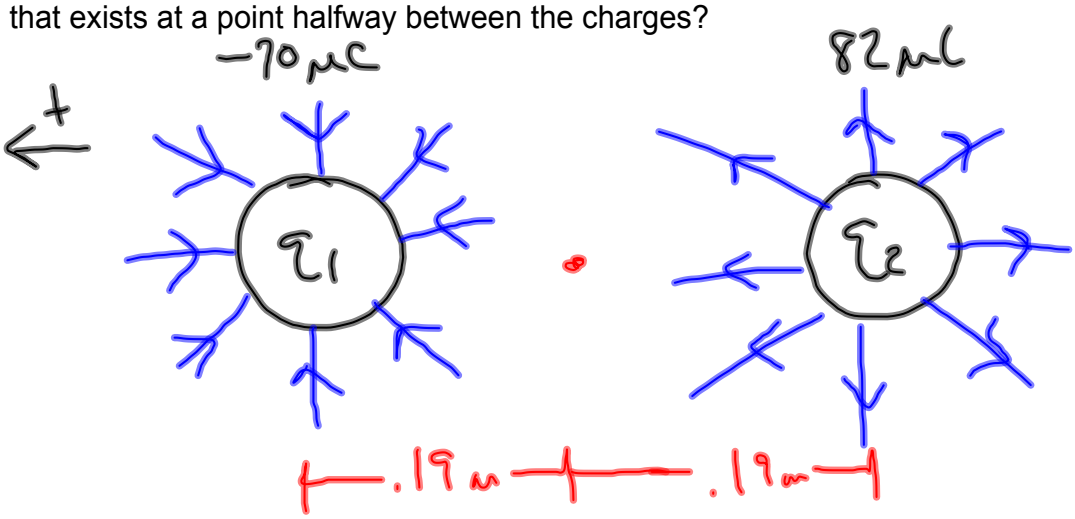
$$\Sigma \vec{E} = \vec{E}_1 + \vec{E}_2$$

$$= \frac{k|q_1|}{r_1^2} - \frac{k|q_2|}{r_2^2}$$

$$= \frac{k(3.5\,C)}{(3\,m)^2} - \frac{k(5.0\,C)}{(3\,m)^2}$$

$$= -1.5E9\ N/C$$

Two charges are stationary in space, and the first has a value of -70 μC and the second has a value of 82 μC. If the distance separating them is 38 cm, what is the electric field that exists at a point halfway between the charges?



$$\Sigma \vec{E} = \vec{E}_1 + \vec{E}_2$$

$$= \frac{k|q_1|}{r_1^2} + \frac{k|q_2|}{r_2^2} \qquad r_1 = r_2$$

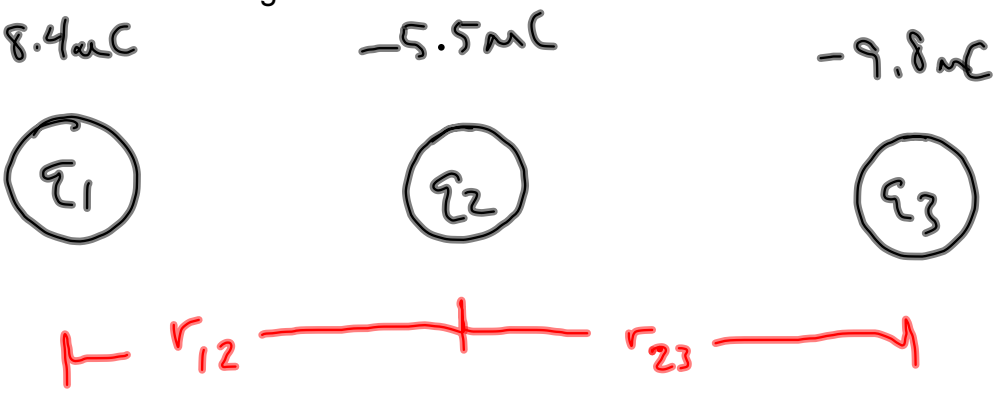
$$= \frac{k|q_1|}{r_1^2} + \frac{k|q_2|}{r_1^2}$$

$$= \frac{k}{r_1^2}\left[|q_1| + |q_2|\right]$$

$$= \frac{k}{(.19\,m)^2}\left[(70E\text{-}6\,C) + (82E\text{-}6\,C)\right]$$

$$= 3.79E7\ N/C$$

Three charges are placed on a line. The farthest left charge has a value of 8.4 μC, the middle charge has a value of -5.5 μC, and the farthest right charge has a value of -9.8 μC. The farthest left and middle charges are separated by 4 cm, and the farthest right and middle charges are separated by 6 cm. What is the electric field that exists at the point of the middle charge?



$$\Sigma \bar{E} = \frac{\Sigma \bar{F}}{q}$$ from problem #3

$$= \frac{394\ N}{(-5.5E-6\ C)}$$

$$= -7.16E7\ N/C$$